LIBRARY
STATE PLANT BOARD

E-505

July 1940

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

THE WHITE-FRINGED BEETLE

By L. J. Padget and K. S. Littig,[1/]
White-Fringed Beetle Control Project,
Gulfport, Mississippi

****

INTRODUCTION

The white-fringed beetle[2/] was first discovered in this country by farmers in Okaloosa County, Fla., who submitted specimens for identification in the autumn of 1936. This insect has been reported in South America and in New South Wales. The time and method of introduction into the United States is unknown.

The white-fringed beetle has apparently become adapted to conditions existing in the Gulf Coast area, and, unless controlled or eradicated, constitutes a menace to the agricultural resources of the South. Its climatic limitations are not known. Larval populations of several hundred per square yard have been found. Farming has proved to be unprofitable in heavily infested fields.

Control of this pest depends upon finding all infestations and promptly reporting these findings so that suppressive measures may be put into effect. This circular furnishes information that should assist persons in recognizing this insect and outlines the measures applied to effect its control and prevent its spread.

Since July 1937 inspection, control, regulatory, and research activities have been conducted by divisions of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture, and the affected States. Research stations have been established at Florala, Ala., Gulfport, Miss., and New Orleans, La., by the Division of Cereal and Forage Insect Investigations. The Division of Control Investigations maintains a station at New Orleans, La. Field offices have been established in each infested area by the Division of Domestic Plant Quarantines, and stringent measures are being taken to control the white-fringed beetle and prevent its dissemination to noninfested territory.

1/ Information pertaining to the Biology and life history has been taken from Circular E-464, "Biology of the White-Fringed Beetle," by H. C. Young and B. A. App, issued in February 1939.

2/ Pantomorus leucoloma (Boh.).

DISTRIBUTION OF THE PEST IN THE UNITED STATES

The following areas are known to be infested with Pantomorus leucoloma (Boh) or a closely related species, Pantomorus peregrinus Buch , both of which are commonly known as white fringed beetles: State of Alabama[2/] Covington Geneva Monroe, Conecuh Mobile and Wilcox Counties; State of Florida[2/] Okaloosa Walton, and Escambia Counties; State of Louisiana[2/] St. Bernard, Orleans, Jefferson, and East Baton Rouge Parishes, State of Mississippi Jones[2/], Harrison[4/] Stone[2/] Covington[2/], Jackson[2/], Hinds[2/] Pearl River[2/], and Forrest[4/] Counties

LIFE HISTORY AND DESCRIPTION

LARVAE

The larvae are of the usual weevil form robust, strongly convex, yellowish white, and legless The larval head is yellowish white, is partially retracted into the body, and bears two stout black mandibles with which the insect feeds upon the roots The full-grown larva is approximately one-half inch in length

During the winter months larvae are less active than in the warmer months Although most of the larvae are found in the first 9 inches of soil specimens have been found at a depth of 24 inches. In March and April the larvae come nearest the surface

Larval Injury

The larvae are voracious feeders and cause severe injury to many of the leading crops of the Southern States. As emergence from the egg takes place in the summer and fall when plants are nearly mature, the damage at that time is not so severe as that caused in the spring when plants are small and easily killed Plants are killed outright or severely stunted by injury to roots In many cases the roots are completely severed The larvae usually feed upon the outer tissues of the roots, but may burrow into the tubers or roots of potatoes peanuts sugarcane, and other succulent plants In heavily infested fields or gardens it has not been uncommon for over 50 percent of the stand to be destroyed.

Larvae of the white fringed beetle have been observed to feed upon over 200 species of plants Some of the more common host plants of the larvae are blackberry broomsedge cabbage Caesar's weed careless-weed carrot chrysanthemum chufa cocklebur, corn, cotton, cowpea, cudweed curled dock false indigo, hair grass Irish potato Johnson grass, Mexican-clover mustard, onion, plantain, peanut, ragweed, sickle-pod strawberry, sweetpotato, tobacco, turnip, velvetbean, and white clover

---

3/ P peregrinus

4/ Both species.

PUPAE

Pupation generally takes place during May, June, or July, depending on the location of the infestation and climatic conditions. The full-grown larva forms a cell in the soil and remains in a quiescent state for several days, after which it transforms to the pupal stage. The pupa is approximately seven-sixteenths of an inch in length and is immobile, except for the abdomen. As the insect is exceedingly delicate in this stage, the slightest pressure may cause a rupture of the body wall and death.

The pupal stage lasts from 8 to 15 days. At the end of this period the pupal skin is molted, and the young adult remains in the pupal cell for several days to enable the body wall to harden.

ADULTS

The adult white-fringed beetle is approximately seven-sixteenths of an inch in length and about five thirty-seconds of an inch across the abdomen. The color is a dull gray or brownish gray, with a lighter band around the margins of the wing covers, giving it its name, the white-fringed beetle. Two light bands are also found on the thorax and head, one above and one below the eye. The body is clothed with fine scales and light hairs. The snout is short and stout, bearing clubbed antennae. The underwings are rudimentary and the wing covers are fused.

The white-fringed beetle is parthenogenetic. Every individual is a female potentially capable of producing eggs that will hatch. A single beetle therefore is theoretically able to establish this insect in any territory where conditions are favorable for existence of the species.

Emergence of beetles from the ground usually takes place after a rain. The emergence of adults usually begins early in May and may continue intermittently until some time in November, but the main emergence usually occurs in July. The newly emerged insect climbs upon the nearest plant or bit of debris to permit further hardening of its body wall. Frequently clusters of newly emerged beetles can be observed on cotton, cocklebur, and other host plants. The adults live for 2 or 3 months and may be found in protected locations such as beneath the leaves, along the stems, or on the ground beneath the plants. After the beetles have fed upon leaf tissue for several days, egg laying begins, continuing intermittently throughout most of the adult period.

The white-fringed beetle can crawl less than a mile, and is unable to fly, but the various transportation facilities of man have enabled it to gain entrance to this country and become established in portions of four Gulf Coast States.

Adult Injury

During the summer and fall months adults may be found feeding upon the leaves of approximately 150 species of host plants, among the most preferred of which are beautyberry, beggarweed, blackberry, buttonweed, Caesar's weed, cocklebur, coffeeweed, cotton, dewberry, dollar-weed, false indigo, gallberry, honeysuckle, hoary-pea, horse-weed, kudzu, lespedeza, maypop, Mexican-clover, peanut, pitcher-pea, ragweed, sickle-pod, smartweed, soybean, and velvetbean. More than 200 beetles have been taken from a single cotton plant.

In general the adults do not cause severe injury to vegetation, but damage results when large concentrations of beetles attack favorite host crops such as peanuts or velvetbeans. Beetles have not been observed to feed on the foliage of corn when other food was available.

EGG STAGE

The eggs are oval, whitish, and a little more than one thirty-second of an inch in length. Masses averaging from 15 to 25 eggs are cemented to sticks, debris, or soil, and are usually partially concealed by fine particles of soil. Eggs deposited during warm weather hatch in a little over 2 weeks if sufficient moisture is present. Eggs have remained viable for more than 7 months when kept in a dry condition. When these egg masses were moistened, larvae soon emerged, indicating that embryonic development had been completed. Experimental evidence indicates that the average beetle may lay more than 800 eggs over a period of several weeks.

CONTROL AND ERADICATION

No important natural enemies of the white-fringed beetle have been found. The insect's ability to feed upon a wide range of host plants, its enormous power of reproduction, and the fact that it spends the greater part of the year underground complicate the control of this pest.

Suppressive and eradicative activities have been conducted in all infested areas by the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, in cooperation with the affected States. Beetle populations have been effectively reduced, and no live adult beetles were found in 1939 in the infested areas at Collins and Taylorsville, Miss., Baton Rouge and Lake Arthur, La., and in two isolated infestations near New Orleans, La.

Poisoning with Calcium Arsenate and Cryolite Dusts

Insecticidal dusts are used effectively for reducing beetle populations in vacant properties, parks, commercial properties, roadsides, and gardens. Cryolite was used in gardens and fields of legumes

because it is relatively nontoxic to mammals, and, when used as a dust, rarely causes burning of tender foliage. Calcium arsenate dust was used as an insecticide on cotton, and in waste lands and woodlands that were not accessible to livestock.

Field observations in dusted areas indicated an average beetle mortality of 75 percent. Under favorable weather conditions a 90 to 95 percent mortality was not unusual. The effectiveness of dusting operations was greatly reduced during periods of incessant rainfall.

Herbicides

An oil-base herbicide has proved very effective in destroying host plants and other vegetation. In addition to the destruction of hosts, the spray kills many beetles by contact.

The herbicide was applied to railroad yards, commercial properties, vacant city lots, and other properties from which white-fringed beetles might be spread. This material was also applied in woodland and abandoned land that might otherwise serve as a reservoir for beetle populations. Insecticidal dusts were applied around sprayed areas to kill beetles that migrated from them in search of food.

Clean Cultivation

Many farms were withdrawn from cultivation because of severe injury caused by white-fringed beetle larvae. These farms were turned over to the Bureau of Entomology and Plant Quarantine for clean cultivation. By disking the land 5 to 7 times during the emergence season, many host plants of the beetle were destroyed, and newly emerged adults were exposed to death by starvation or by exposure to the direct rays of the sun. Since white-fringed beetles are unable to deposit viable eggs before obtaining food, they are forced to migrate in search of host vegetation. Beetles reaching the margins of the clean cultivated fields are poisoned by feeding upon dusted foliage around the fields.

Clean cultivation has been found the most successful method of combating the white-fringed beetle. In one year larval populations can be reduced to extremely small numbers by this method.

Fumigants

Fumigation has proved very effective in killing larvae and pupae in the soil. On account of its high cost, however, the use of this method of control is confined to small infestations where it is necessary to treat only a limited amount of land. Since the fumigation of the infested areas at Collins and Taylorsville, Miss., no white-fringed beetles have been found there in any stage of development.

SCOUTING TO LOCATE INFESTATIONS

Inspection for Larvae

During the winter and spring, when very few adults are present, inspection for larvae is the only method for finding white-fringed beetle infestations.

When the roots of plants are attacked by larvae, wilting or death of the plants usually results. In heavily infested fields larvae can be found around the roots of the wilted plants, this condition being particularly noticeable in fields of cotton, corn, or peanuts or in areas grown up to Mexican clover or cocklebur. It is not necessary to dig a large amount of earth to find specimens, as the larvae will usually be found upon the root itself or in close proximity.

Larvae are most likely to be found around the roots of favorite host plants of the adult where egg laying was concentrated during the preceding year. A list of these plants is given in the discussion of adult injury.

As larvae are perishable they should be put in vials of 75 percent alcohol soon after they are found. When these materials are not immediately available, put some earth in the container with the specimens until preserving fluid can be obtained. Vials of specimens should be shipped in mailing tubes or suitable cartons to protect them from damage in the mails. UNDER NO CONDITIONS SHOULD LIVE SPECIMENS BE SUBMITTED, BECAUSE INFESTATIONS MIGHT BE SPREAD IF THESE SPECIMENS WERE LOST. Complete field notes, including host plant, exact location where found, city or town, State, date, and name and address of the collector, should accompany all specimens.

Inspection for Adults

White-fringed beetle adults have been found in cultivated fields, railroad yards, dock properties, railway or highway embankments, woodlands, nurseries, commercial properties, waste areas, and residential sections, being most numerous on well drained cultivated land. In all these locations the adults are most numerous on favorite host plants or in their immediate vicinity. Highway intersections, intersections of highways with railroads, fence rows, culverts, and vacant lots often have heavy growths of blackberries, ragweed, cocklebur, bitterweed, coffeeweed, and other host plants. On farm properties beetles are usually most numerous on peanuts, cotton, velvetbeans, cockleburs, and other host plants.

Beetles seem to prefer the mature leaves to the tender buds. Most of the feeding takes place in daylight.

The feeding signs of the white-fringed beetle are easily distinguished from injuries caused by some insects, but cannot be distinguished from signs made by other beetles which feed from the outer margin of the leaves. Look for semicircular cuts made in the margin of the leaf and disregard leaf punctures, leaf mines, and other injuries in which the leaf margin is not cut. The white-fringed beetle adult clings to the leaf margin and removes a crescent of leaf material, working from the margin toward the midrib. Each time a crescent of leaf tissue is removed the half moon area in the leaf is enlarged. Additional areas of material are taken out until a large vein or midrib is reached, or until feeding has been completed. In Figure 1-A, a close-up of the feeding sign, note that while the outer portion of the injury is smooth, the inner portion has a serrated edge. On soft leaf tissue the serrations are smooth, but on tough tissue the dentation is rough. Figure 1-B shows a severely damaged peanut leaf.

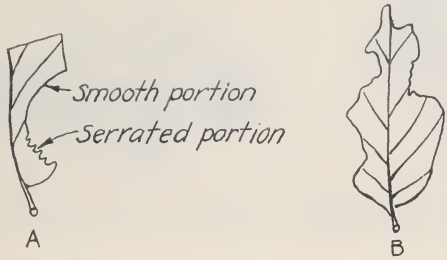


Figure 1.-- White-fringed beetle injury to peanut foliage.

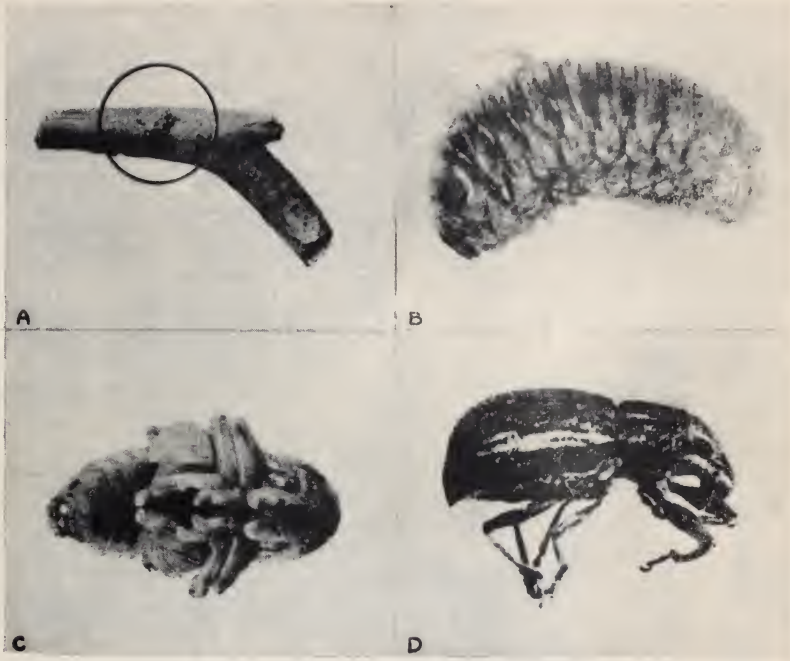
Close inspection of host plants is necessary in order to find feeding signs, where populations are light. A magnifying glass may be used to detect whether or not the feeding signs are fresh, for the old signs will show a slight discoloration. If the signs are fresh, the beetles may usually be found on the under side of the leaves, on the stems, or on the ground close to the plant. Often the insects will drop from the plant when disturbed and feign death, so they are difficult to detect.

Beetles submitted for identification should be killed in a cyanide bottle or placed in 75 percent alcohol. Living specimens cannot be sent through the mails without special authorization. Since the escape of a single beetle can start a new infestation, it is important that all specimens be killed before they are transported from an infested area. Specimens should not be shipped in envelopes, or other flimsy containers, but should be carefully packed in mailing tubes or cartons that will not be damaged in the mails.

Please report findings of insects resembling the white-fringed beetle to your county agent or State entomologist, or to White-Fringed Beetle Control, Post Office Box 989, Gulfport, Miss. In submitting specimens, furnish information including the date, location of infested property, host plant, city or town, State, and name and address of the collector.

Digitized by the Internet Archive
in 2013

http://archive.org/details/whitefringedbeet00unit_0



DESCRIPTION OF THE DIFFERENT STAGES

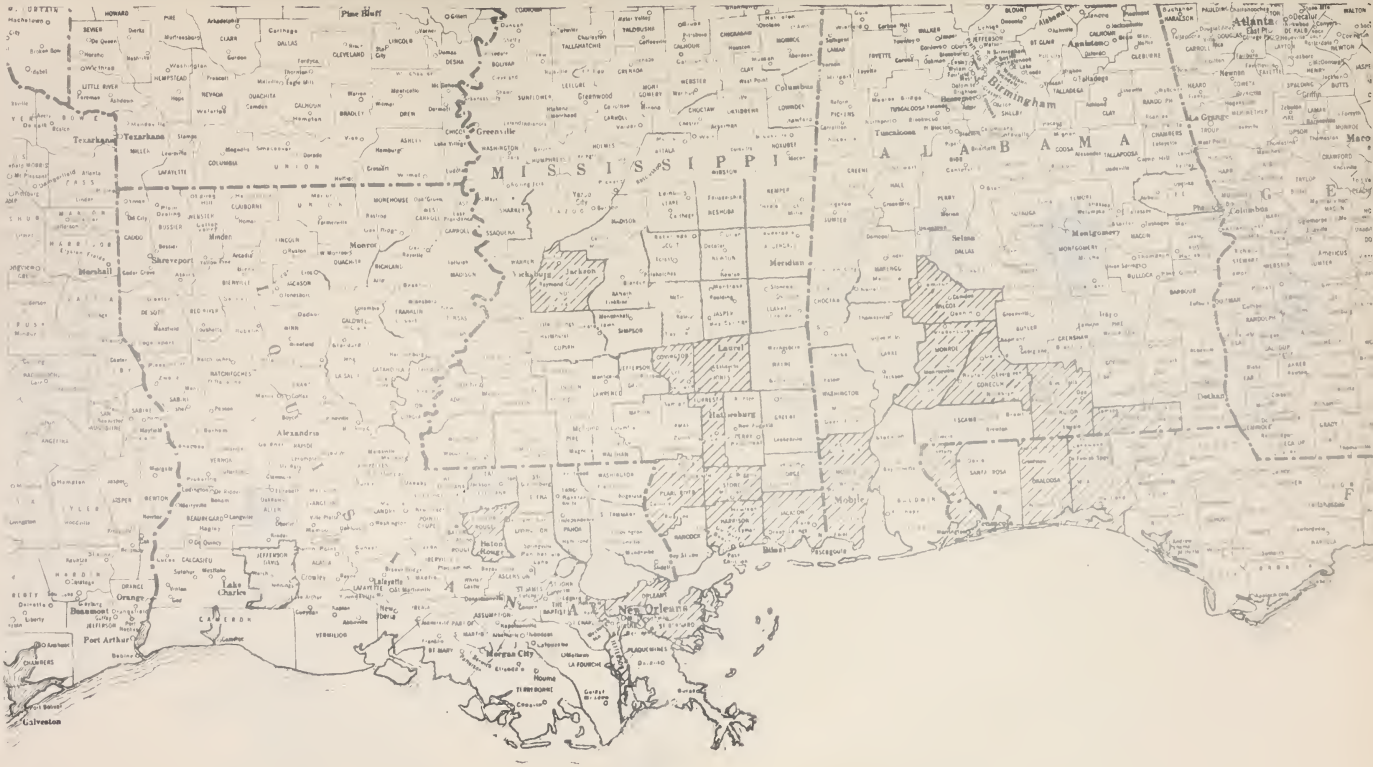
A. Egg mass of the white-fringed beetle, Pantomorus leucoloma. Eggs are deposited in masses of a few to 60 or more on sticks, debris, or soil, and are usually covered with fine particles of soil. Approximately 800 eggs are laid.

B. The larva when full-grown is approximately one-half inch in length. The body is yellowish white, with small, yellowish brown head, fleshy, more or less curved, legless, and sparsely covered with hair.

C. The pupa is approximately seven-sixteenths inch in length, and when first formed is white. Parts of the body and legs darken somewhat before transformation.

D. The adult is approximately one-half inch in length and about one-sixth of an inch in width across the abdomen. The color is brownish gray to gray with a lighter band along the margins of the wing covers. The body is densely covered with pale hairs, which are especially long on the wing covers. The wings are fused together, and the adults are incapable of flight.

LIBRARY
STATE PLANT BOARD



WHITE-FRINGED BEETLE INFESTATIONS

- INFESTED

Scale of Miles

0 25 50 75 100 125

TYPICAL BLACKBERRY FOLIAGE
SHOWING ADULT INJURY
BY THE WHITE-FRINGED BEETLE

TYPICAL BEGGARWEED FOLIAGE
SHOWING ADULT INJURY
BY THE WHITE-FRINGED BEETLE

TYPICAL PEANUT FOLIAGE
SHOWING ADULT INJURY
BY THE WHITE-FRINGED BEETLE

CORNFIELD HEAVILY DAMAGED BY WHITE FRINGED BEETLE LARVAE

LARVAL INJURY TO IRISH POTATOES

UNIVERSITY OF FLORIDA
3 1262 09224 7401